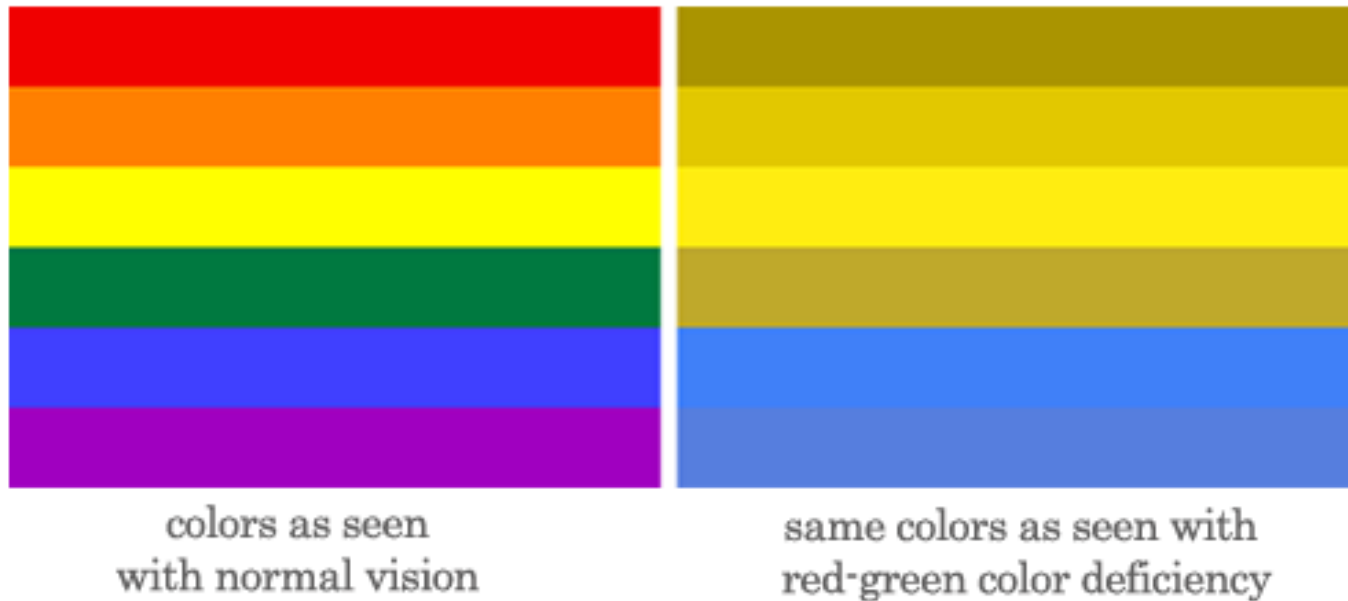


Color Blindness Made Simple

An introduction to color blindness for kids

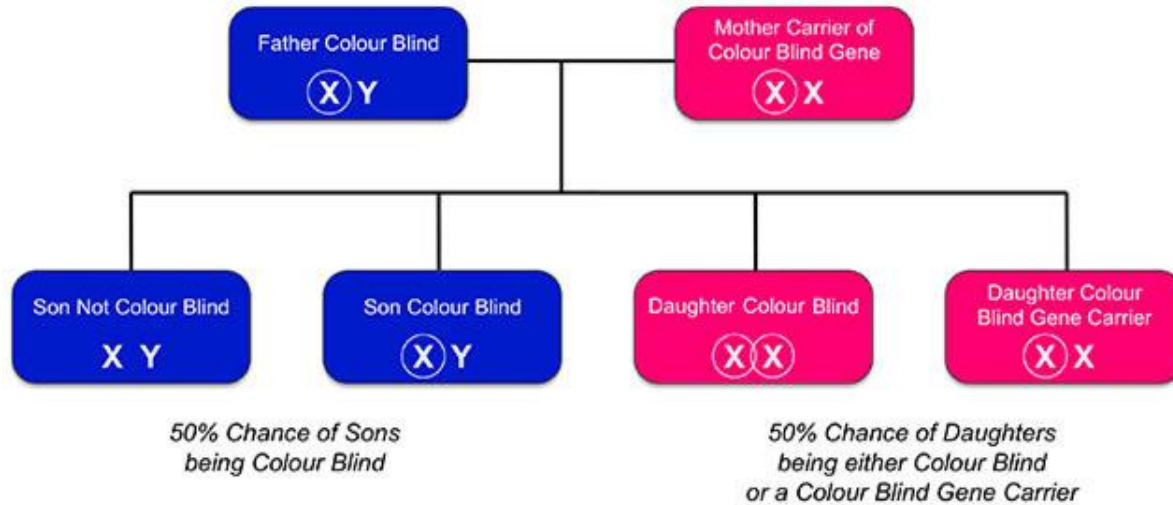
Common Misconceptions

- ▶ Being color blind does not mean that a person cannot see any colors at all
- ▶ There are many different kinds of color blindness
- ▶ Usually, people will have a hard time telling certain colors apart, such as red and green



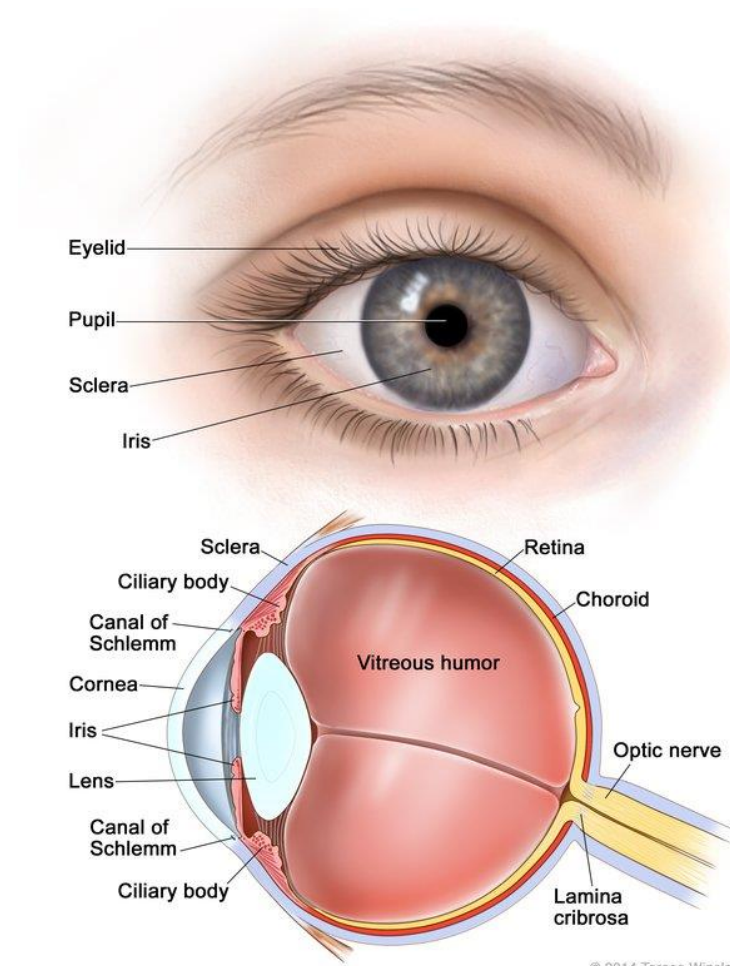
Do I know anyone that is color blind?

- ▶ Being color blind is almost always genetic, meaning people are born with it
- ▶ The odds that someone even in your own classroom is color blind are very high
- ▶ About 1 in 25 kids has some form of color blindness. It is a sex-linked trait, meaning it is usually more common in boys than girls.
- ▶ This is because girls can carry the gene, which means they have it but are not affected by it, while boys are not able to do this. If a boy has the gene, he is always affected



How Your Eyes See Color

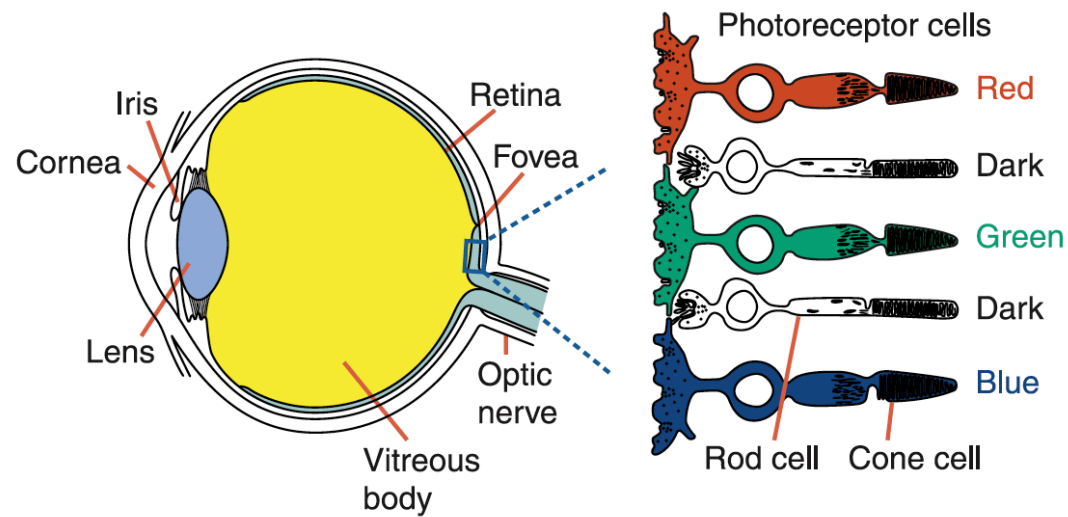
- ▶ Light from the sun or from a light bulb bounces off everything that your eyes see and goes through the pupil (the black hole in the center of the front of your eye).
- ▶ The light reaches the retina at the back of your eye.
- ▶ In the retina there are millions of cells called rod cells and cone cells - these are the nerve cells which 'see' the light.



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How Color Blindness Affects the Eye

- ▶ These nerve cells in the back of the eye, cones, are what allow someone to see and identify different colors
- ▶ The cones in children with colorblindness either don't exist or don't work correctly

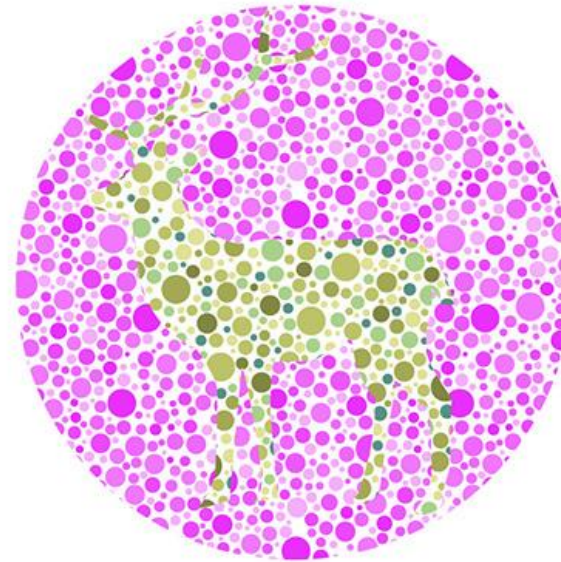
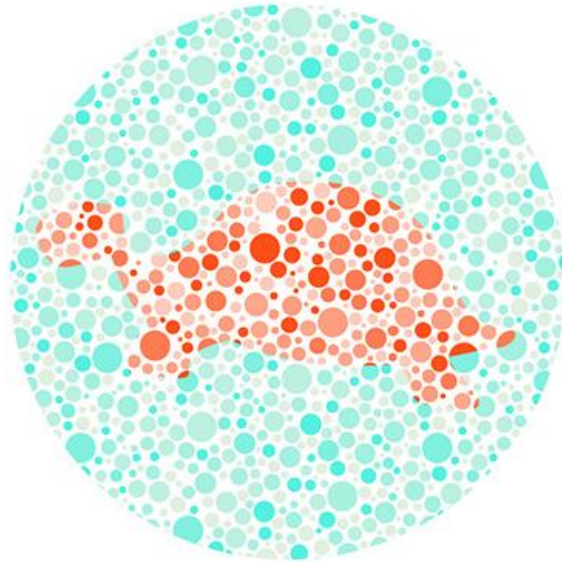
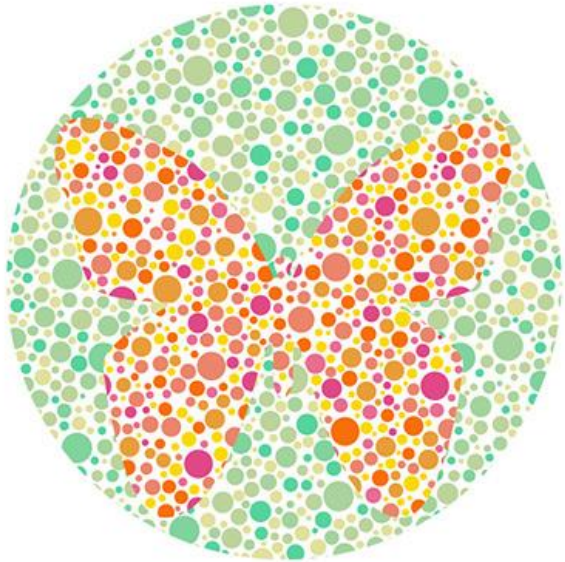


Testing for Color Blindness

- ▶ Most kids get tested around the age of 4, when they first begin to understand how to participate in the exam
- ▶ The Ishihara Color Sightedness Assessment is the most common way of testing
- ▶ This test is easy enough to complete on your own
- ▶ It consists of a few cards that show a circle filled with dots. At first, these dots look like they are random placed in the circle, but if you are not color blind you will soon see that there is a picture or number within the dots

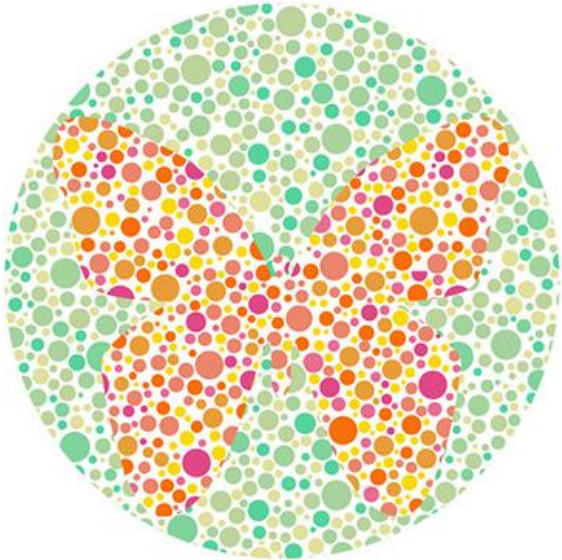
Let's try some examples!

Can you identify the animals in these circles?

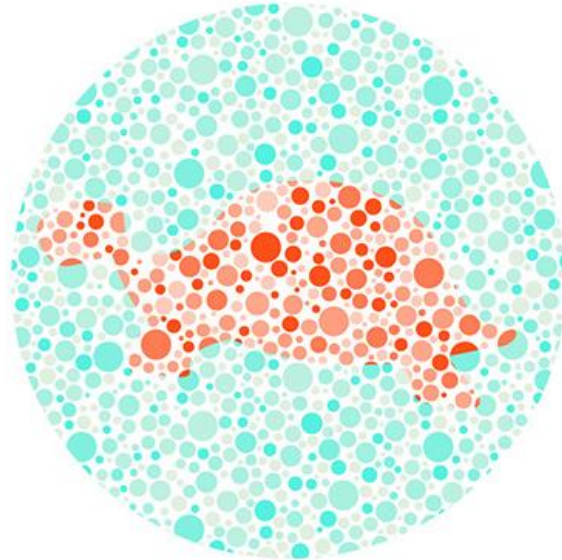


Can you identify the animals in these circles?

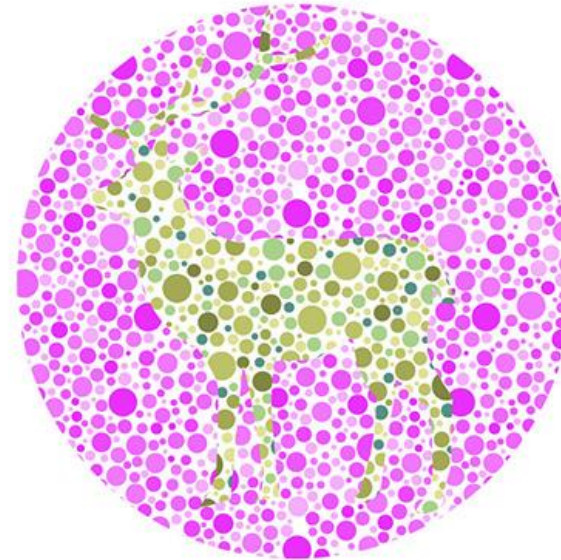
Butterfly



Turtle

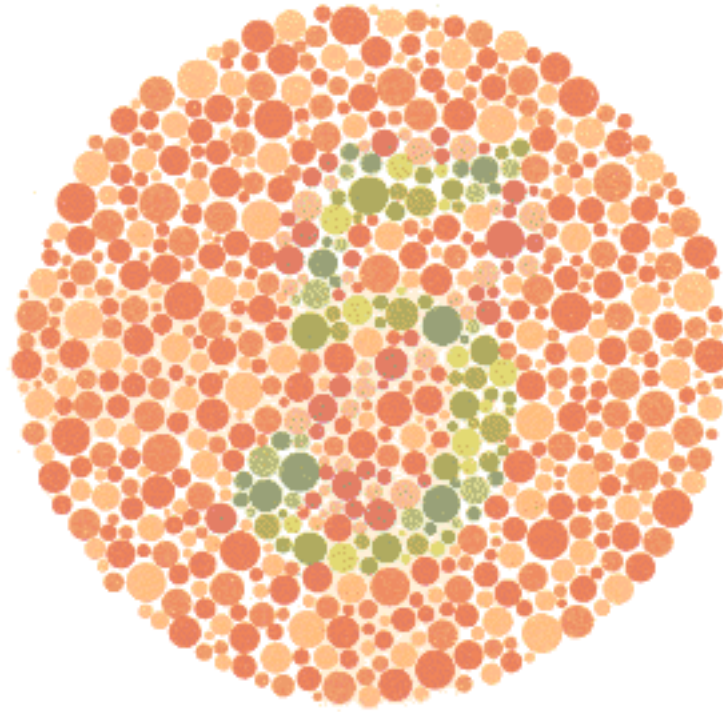
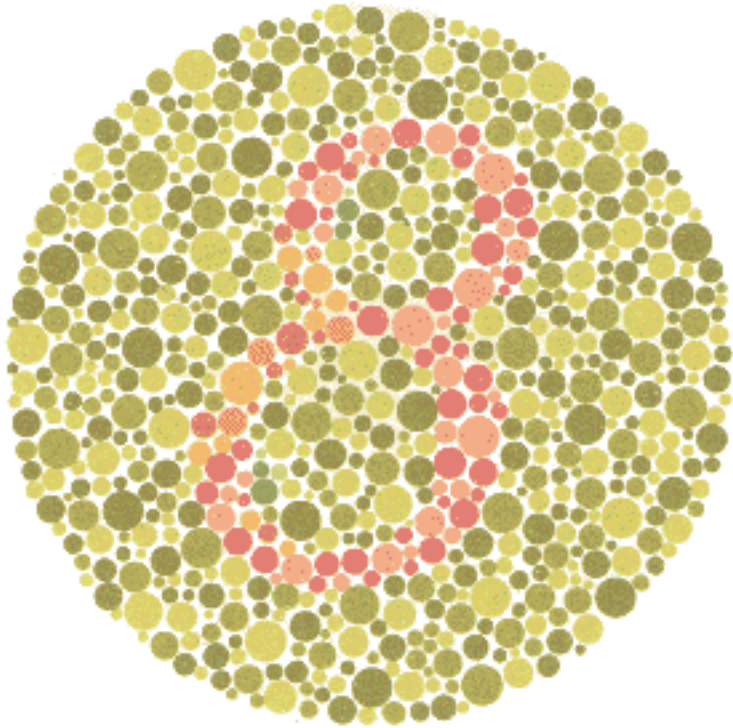


Deer



Ready for the next set?

Can you identify the numbers in these circles?



What did you see?

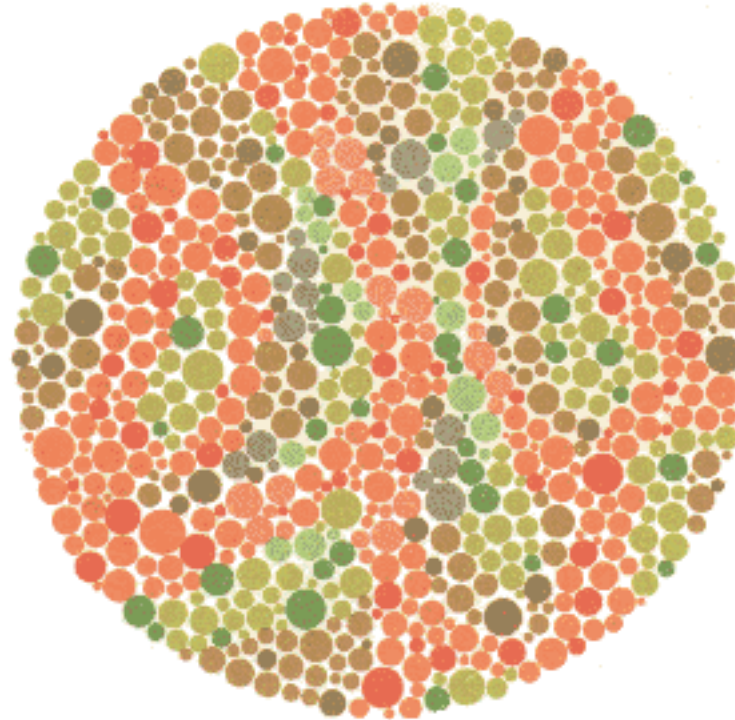
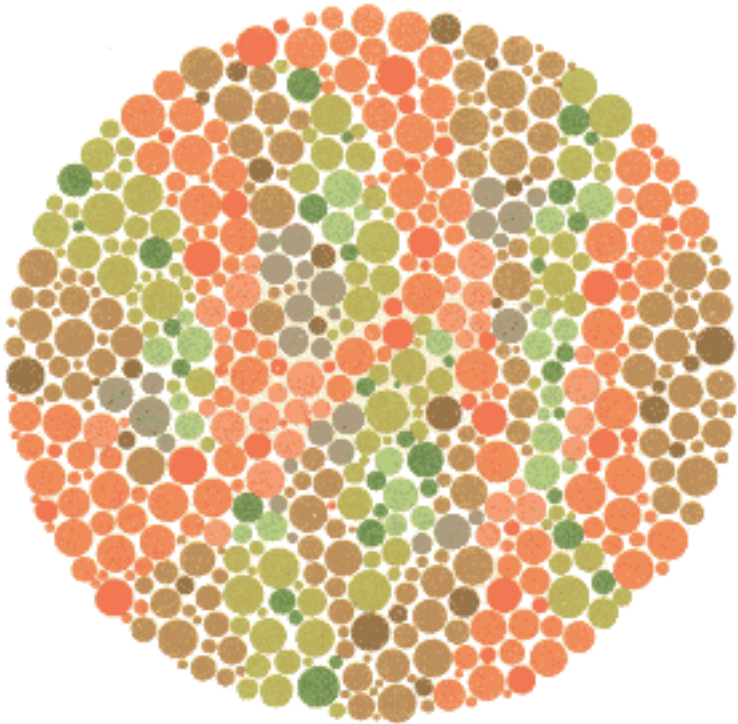


- ▶ People with normal color vision see the number 8
- ▶ People with red-green color blindness see the number 3
- ▶ Those with total color blindness see nothing

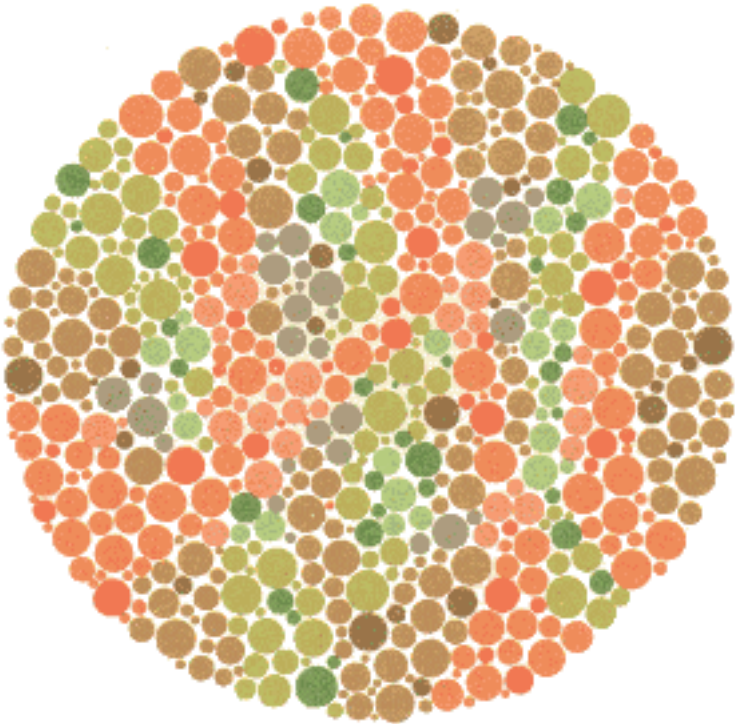


- ▶ People with normal color vision see the number 5
- ▶ People with red-green color blindness see the number 2
- ▶ Those with total color blindness see nothing

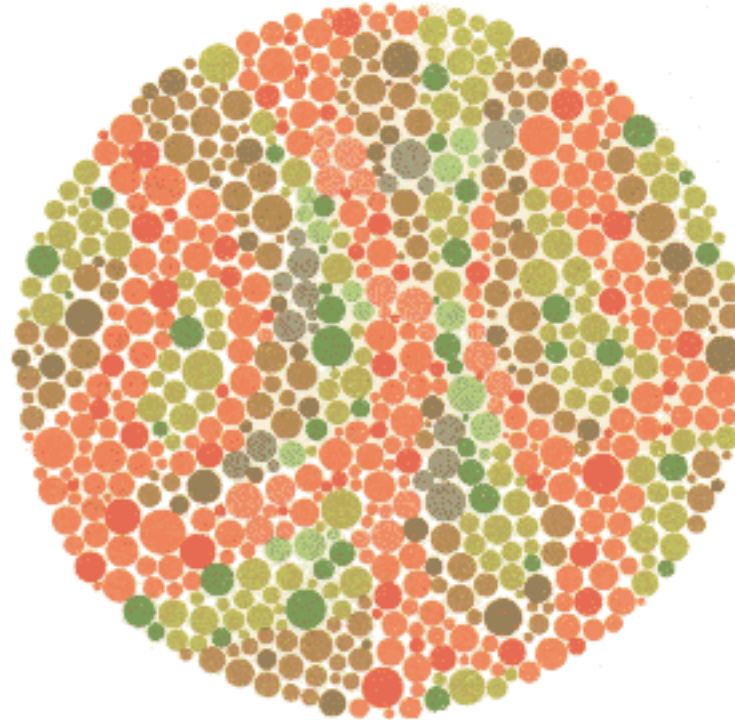
Think you might be affected? What do you see here?



Think you might be affected? What do you see here?

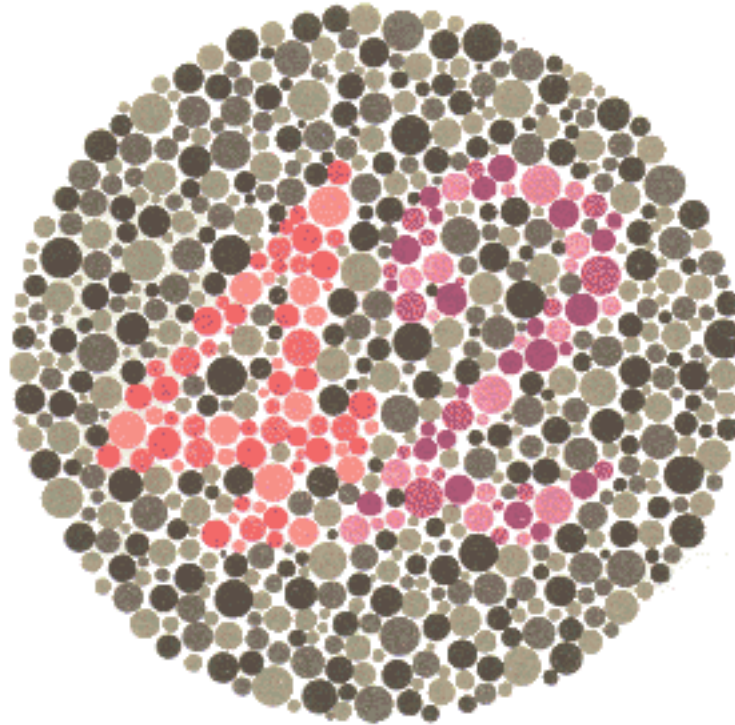
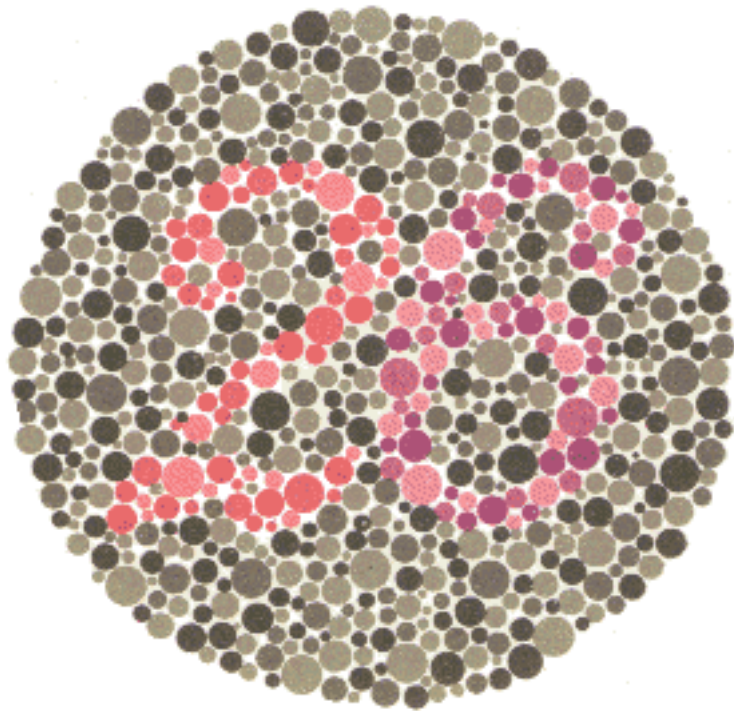


- ▶ People with red-green color blindness see the number 45
- ▶ Those with normal color vision see nothing



- ▶ People with red-green color blindness see the number 5
- ▶ Those with normal color vision see nothing

One more set, what do you see here?



One more set, what do you see here?

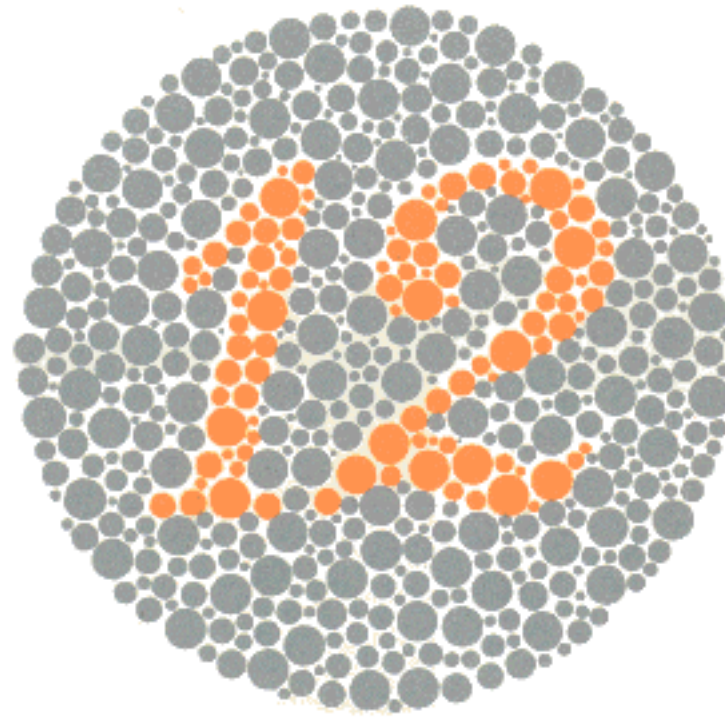
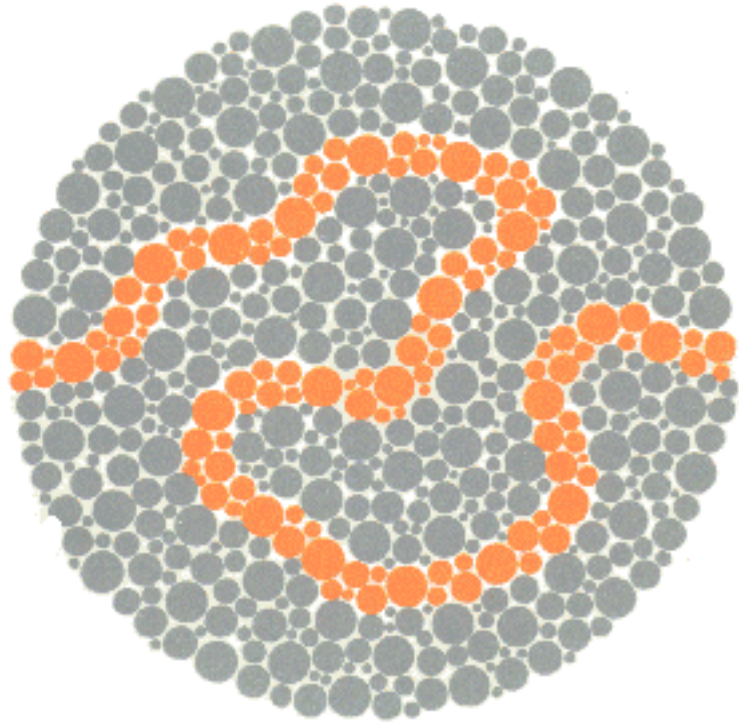


- ▶ People with normal color vision see the number 26
- ▶ Green color blind (**deuteranopia**) people will see a 2, mild green color blind people (**deuteranomaly**) may also faintly see a number 6.



- ▶ People with normal color vision see the number 42
- ▶ Red color blind (**protanopia**) people will see a 2, mild red color blind people (**prontanomaly**) will also faintly see a number

BONUS ROUND! What do you see here?



If you guessed incorrectly...

Ha! I got you! It's a trick question



- All people, color blind or not, should be able to make out the hidden message within both of these pictures!

Helping our friends that are color blind

- ▶ Because people are color blind from birth, they usually don't know they are color blind. They don't know that other people see things differently.
- ▶ They might think that they are dumb when someone calls them out for putting green things in the same pile as red things, or they might be confused when someone does it correctly.
- ▶ Being color blind is not having a disease.
- ▶ It is not something that makes a person less clever than someone else.
- ▶ It is not something to tease someone about.
- ▶ Ask your friends how they feel and if there is anything you can do to make their lives easier.



To Review

- ▶ Today we learned that color blindness is genetic, and affects millions of people worldwide.
- ▶ Color blindness occurs from problems with the cones in a person's eyes
- ▶ Just because someone is color blind, doesn't always mean they only see in black and white.
- ▶ There are many different kinds of color blindness, the Ishihara Test we took today is just one example
- ▶ Help your friends that may be affected, and try to learn something from them!



References

- ▶ <https://iristech.co/test-vision/#test>
- ▶ <https://iristech.co/how-the-red-green-colorblind-test-works-for-kids/>
- ▶ <http://understandinggraphics.com/design/designing-for-color-blindness/>
- ▶ <http://medicastore.com/m/index.php?mod=penyakit&id=3581>
- ▶ <https://www.colour-blindness.com/colour-blindness-tests/ishihara-colour-test-plates/>
- ▶ <http://www.cyh.com/HealthTopics/HealthTopicDetailsKids.aspx?p=335&id=1700&np=152>